MULTISTANDARD MULTIMODE DIGITAL & ANALOG TERRESTRIAL TV TRANSMITTER LINE - COMPACT SERIES

The high quality, professional and cost-effective solution

DIGITAL OPERATION SPECIFICATIONS

Transmission standard: OFDM (DVB-T/H; DVB-T2; ISDB-T/Tb); 8VSB (ATSC); other on request for detailed specifications see driver specific documentation

Intermodulation products (shoulders) just outside channel edges (before output filter): According to the model and power output (typ. Spec. ±3dB with reference to emission channel centre power density)

MER – Modulation Error Ratio: According to the model and power output (typ. Spec. ±3dB)

Input interface options:ASI; Ethernet (1 G, over IP); DVB-S/S2 multistream receiver; terrestrial receiver (for different input interfaces and specifications, see driver specific documentation)

ANALOG OPERATION SPECIFICATIONS

Transmission standard:

B, G, D, H, I, K, K1, M or N

In band intermodulation products ≤ -60dB (typical; max. -60dB – Test: V.C.: -6dB; S.C.: -10dB; C.S.: -16dB)

Video input: 1Vpp (75Ω BNC-f) – video processing include ALC and signal reconstruction

Transmitted Video quality parameters:
- Differential gain: within ±1.5% (typical; max.±5%); Differential phase: ±1.5° (typical; max.±3°)
- 2T K rating: 1% (typical; max 2%); Random noise (weighted typical): ≥60dB;
- Group delay response (V.C. to C.S.): Within ±40ns

Amplitude / frequency response: (DVB-T/H, DVB-T2, ISDB-T/Tb, ATSC and other standards).

Audio input: 0dBm (adjustable) 600Ω bal. / unbal.

Audio options:
- Stereo / dual sound IRT; BTSC; other on request

Transmitted Audio quality parameters:
- Amplitude / frequency response: ±0.5dB (typical; max. ±1dB); Harmonic distortion ≤0.4%

GENERAL SPECIFICATIONS

Power supply: According to the model: 90 to 264 Vac single phase or 207 to 415 three phases 50/60Hz

Remote control interface options:
- RS485; Ethernet 10/100 Base-T (SNMP - web server - e-mail client)

Remote firmware upgrade: supported

Housing:
- Standard rack 19” U or 3U or 5U according to the model - rack cabinet available as option

Operating temperature range: -5 to +45°C

Maximum operative humidity: 90% non condensing

10, 25, 50, 100, 200, 250, 500, 1000W COMPACT TV TRANSMITTER - TRANSPORER

FEATURES:
- A high performance digital & analog Multistandard Multimode TV Transmitter Line featuring latest technology
- High reliability and extremely compact size
- Low power consumption
- Low cost of ownership, low capital cost, running expenses & maintenance

ABE Elettronica is proud to present the “MTX” Compact Series of Transmitters – Transposers - Gap-fillers for Analog and Digital Terrestrial Television Broadcasting (DVB-T/H, DVB-T2, ISDB-T/Tb, ATSC and other standards).

With the company’s 30 years of experience in this field, the “MTX” Series is the ultimate in technology, quality and performance; it is designed to take ad-vantage of the excellence of the digital modulation systems to generate both Analog and Digital emissions. This new “MTX” Compact Series of Transmitters – Transposers - Gap-fillers brings together the highly efficient and reliable ABE MOS and LD-MOS broadband Power Amplifiers with state-of-the-art technological solutions.
The Compact MTX Transmitter/Transposer Series is a professional product line, suitable for the integration in both analog and digital TV transmission networks (DVB-T/H, DVB-C, ISDB-T/ISDB-Ts and others operating both MNF and SFN).

The equipment is fully contained in a single 19" rack drawer and is capable, with its internal RF power amplifier, to provide up to 500Wavg digital output or 1,000Wp.s.in analog mode. Featuring a modular construction – with easily replaceable boards and parts - the MTX exploits the advantages of latest components and mounting technologies to achieve high-reliability and comprehensive system flexibility - all in a reduced footprint.

Maintenance, control as well as parameter changes and settings, are simple and easy-to-perform operations.

The equipment can be equipped with one or more digital processor boards according to the calculation and processing capacity requested by the TV standard's implemented in the transmitter / transposer.

For example, if the unit is used for analog multistandard TV emission (B/G/D/K/L/K1/K4/K11/K14/K15 standards) or for one of the first generation digital TV standards (e.g. DVB-T/H, ISDB-T...), just one digital processor board is enough.

The digital processor board can store one or more different TV standards without any firmware upgrade.

If optional functions are needed (like re-multiplexing, seamless switching and others) it is necessary to equip the unit with two digital processor boards. For the DVB-T2 TV standard are necessary three digital processor boards.

A key function of the equipment is the digital linear and non-linear pre-correction with the possibility to store and recall up to 8 different pre-sets. The linear pre-correction changes the amplitude and group delay versus the frequency to prevent distortion mainly introduced by the output filter of the transmitter. The non-linear pre-correction introduces a pre-distortion in the amplitude and phase based on the level required to correct the non-linearity mainly introduced by the power amplifier, therefore giving the opportunity to increase the output power MER and shoulder performance.

 Optionally, for digital modulations, it's possible to equip the MTX Compact Transmitter with the adaptive non-linear pre-correction module which automatically provides the linearization.

The transmitter can manage up to 4 inputs with “near-seamless” or, optionally, “seamless” automatic switching.

Several interface types are available for different configurations:

- **ADC** (Analog to Digital Converter) for Video and Audio analog inputs (for analog modulation only)
- **ASI** (Asynchronous Serial Interface)
- **Ethernet** (T.S. over IP) to receive MPEG transport streams (encapsulation ProfiPeg COP9 64 kbit/s)
- **DVB-S2/S2Q** receiver for reception from satellite or from a radio link and for transponder and configuration as transmodulator or gap-filler. (The receiver can optionally support multistream and PL de-scrambling)
- **DVB-T/H** terrestrial reception for configuration as a regenerative repeater

The MTX can optionally be equipped with a CAM (Conditional Access Module) to decrypt encoded Transport Streams (i.e. from the DVB-S2 satellite receiver).

The optional digital processor can also provide re-multiplexing functions (with PID filtering, insertion / change of tables, etc.) and “seamless” switching between two transport stream inputs; in this way, when operating in SFN mode, the transmitter doesn't interrupt the emission when switches between input transport streams from primary to secondary or vice versa.

The transmitter is equipped with a direct digital synthesis modulator with the possibility to select any output frequency in the operating frequency range with 1Hz resolution.

The GNSS receiver option, specifically developed for the timing function, provides time and frequency signals (1PPS and 10MHz) necessary for the synchronization of the transmitter when operating in SFN Mode.

This is a new concept Timing Reference GNSS Locked generator with unique specifications, stability, and linearity algorithms, to prevent network de-synchronization (Holdover error recovery). Single satellite operation, Fast cold start-up, Zero cumulated error, etc. and is available in redundant configuration (double radio). Moreover, the reference high-stability “oven type” oscillator employed is capable of maintaining the synchronization over long periods when there is an intermittent signal from the GNSS satellite (holdover function). In analog transmission mode, with the GNSS receiver option, the equipment can also operate in “precision offset” mode, to reduce co-channel interference.

The wide-band and high-efficiency (low power consumption compared with the output power) Power Amplifier employs the latest generation of MOS and LD-MOS semi-conductors that feature a very linear amplification characteristic further enhanced by the modulator's digital non-linear pre-cooler. The RF output Power Amplifier operates in a redundant configuration.

The efficiency of the transmitter is further improved by the use of Switched-Mode power supplies equipped with PFC. Power Factor (cos ϕ) Corrector, in order to minimize reactive power consumption.

The MTX transmitter/transposer can operate in redundant configuration (1+1 and/or N+1) by means of an external change-over unit.
The Compact MTX Transmitter/Transposer Series is a professional product line, suitable for the integration in both analog and digital TV transmission networks (DVB-T/H, DVB-S/S2, ISDB-T/ISDB-Tb and others operating both M&N and SFN).

The equipment is fully contained in a single 19” rack drawer and is capable, with its internal RF power amplifier, to provide up to 500Wavg digital output or 1,000Wp.s. in analog mode. Featuring a modular construction – with easily replaceable boards and parts - the MTX exploits all advantages of latest components and mounting technologies to achieve high-reliability and comprehensive system flexibility – all in a reduced footprint. Maintenance, control as well as parameter changes and settings, are simple and easy-to-perform operations.

The equipment can be equipped with one or more digital processor boards according to the calculation and processing capacity requested by the TV standard’s implemented in the transmitter / transposer: For example, if the unit is used for analog multistandard TV emission (B.G.D.H.I.K.I.K.M/N standard) or for one of the first generation digital TV standards (e.g. DVB-T/H, ISDB-T...), just one digital processor board is enough.

The digital processor board can store one or more different TV standards without any firmware upgrade.

If optional functions are needed (like re-multiplexing, seamless switching and others) it is necessary to equip the unit with two digital processor boards. For the DVB-T2 TV standard are necessary three digital processor boards. A key function of the equipment is the digital linear and non-linear pre-correction with the possibility to store and recall up to 8 different pre settings. The linear pre-correction changes the amplitude and group delay versus the frequency to prevent distortion mainly introduced by the output filter of the transmitter. The non-linear pre-correction introduces a pre-distortion in the amplitude and phase based on the level required to correct the non-linearity mainly introduced by the power amplifier, therefore giving the opportunity to increase the output power, MER and channel performance.

Optionally, for digital modulations, it’s possible to equip the MTX Compact Transmitter with the adaptive non-linear pre-correction module which automatically provides the linearization.

The transmitter can manage up to 4 inputs with “near-seamless” or, optionally, “seamless” automatic switching.

Several interface types are available for different configurations:

- ADC (Analog to Digital Converter) for Video and Audio analog inputs for analog modulation standards
- ASI (Asynchronous Serial Interface)
- Ethernet (T.S over IP) for receiving MPEG transport streams (encapsulation Prosipex COP9 m1.2)
- DVB-S2/S receiver for reception from satellite or from a radio-intermediate transmitter and for configuration as modulator or gap-filler. (The receiver can optionally support multisystem and PL de-scrambling)
- DVB-T/H terrestrial reception for configuration as a regenerative repeater

The MTX can optionally be equipped with a CAM (Conditional Access Module) to decrypt encoded Transport Streams (i.e. from the DVB-S2 satellite receiver).

The optional digital processor can also provide re-multiplexing functions (with PID filtering, insertion / change of tables, etc.) and “seamless” switching between two transport stream inputs; in this way, when operating in SFN mode, the transmitter doesn’t interrupt the emission when switches between input transport streams from primary to secondary or vice versa.

The transmitter is equipped with a digital direct synthesis modulator with the possibility to select any output frequency in the operating frequency range with 1Hz resolution.

The GNSS receiver option, specifically developed for the timing function, provides time and frequency signals (PPS and 10MHz) necessary for the synchronization of the transmitter when operating in SFN Mode. This is a new concept Timing Reference GNSS Locked generator with unique accuracy, stability and linearity algorithms, to prevent network de-synchronization (Holdover error recovery). Single satellite operation, Fast cold start-up, Zero cumulated error, etc. and is available in redundant configuration (double radio).

Moreover, the reference high-stability “oven type” oscillator employed is capable of maintaining the synchronization over long periods when there is an intermittent signal from the GNSS satellites (holdover function). In analog transmission mode, with the GNSS receiver option, the equipment can also operate in “precision offset” mode, to reduce co-channel interference.

The wide-band and high-efficiency (low power consumption comparison with the output power) Power Amplifier employs the latest generation of MOS and LD-MSO semi-conductors that feature a very linear amplification characteristic further enhanced by the modulator’s digital non-linear pre-correction. The RF-output Power Amplifier operates in a redundant configuration.

The efficiency of the transmitter is further improved by the use of the Switched-Mode power supplies equipped with PFC, Power Factor (cos ϕ) Corrector, in order to minimize reactive power consumption.

The MTX transmitter/transposer can operate in redundant configuration (1+1 and/or N+1) by means of an external change-over unit.
**DIGITAL OPERATION SPECIFICATIONS**

**Transmission standard:** OFDM (DVB-T/H; DVB-T2; ISDB-T/Tb); 8VSB (ATSC); other on request. For detailed specifications see driver specific documentation.

**Intermodulation products (shoulders) just outside channel edges (before output filter):** According to the model and power output (typ. Spec. ≤±50dB).

**MER – Modulation Error Ratio:** According to the model and power output (typ. Spec. ≥35dB).

**Input interface options:** ASI; Ethernet (T.S. over IP); DVB-S/S2 multistream receiver; terrestrial receiver (for different input interfaces and specifications, see driver specific documentation).

**ANALOG OPERATION SPECIFICATIONS**

**Transmission standard:** B, G, D, H, I, K, K1, M or N.

**In band intermodulation products:** ≤ -40dB (typical; max. -66dB – Test: V.C. -8dB; S.C. -10dB; C.S. -16dB).

**Video input:** 1Vpp (75Ω BNC-f) – video processing include ALC and signal reconstruction.

**Transmitted Video quality parameters:**
- Differential gain: within ±1.5% (typical; max. ±5%); Differential phase: ±1.5° (typical; max. ±3°).
- 2T K rating: 1% (typical; max 2%); Random noise (weighted typical): ≥60dB.
- Group delay response (V.C. to C.S.): Within ±40ns.
- Amplitude / frequency response: (V.C. to C.S.) Within ±0.5dB (typical; max. ±1dB).

**Audio input:** 0dBm (adjustable) 600Ω bal./ unbal.

**Audio options:** Stereo / dual sound IRT; BTSC; other on request.

**Transmitted Audio quality parameters:**
- Amplitude / frequency response: ±0.5dB (typical; max. ±1dB); Harmonic distortion: ≤0.4%.

**GENERAL SPECIFICATIONS**

**Power supply:** According to the model: 90 to 264 Vac single phase or 207 to 415 three phases 50/60Hz.

**Remote control interface options:** RS485; Ethernet 10/100 Base; SNMP - web server - e-mail client.

**Remote firmware upgrade:** supported.

**Housing:** Standard rack 19" 1U or 3U or 5U according to the model - rack cabinet available as option.

**Operating temperature range:** -5 to +40°C.

**Maximum operative humidity:** 95% non condensing.

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**MTX Transmitter-Transposer block diagram**

**ABE Elettronica**

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